Eelgrass and Human Impacts

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Eelgrass in the Great Bay Estuary

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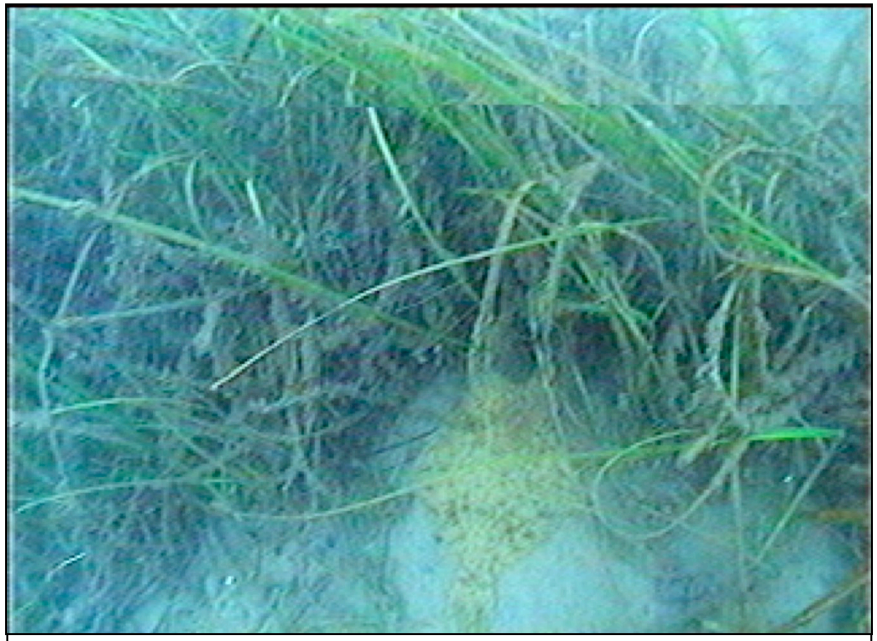
New Hampshire / Maine

FUNCTIONS & VALUES



1) primary production

2) nutrient uptake & storage

3) oxygen production

4) physical structure

5) epibenthic & benthic production

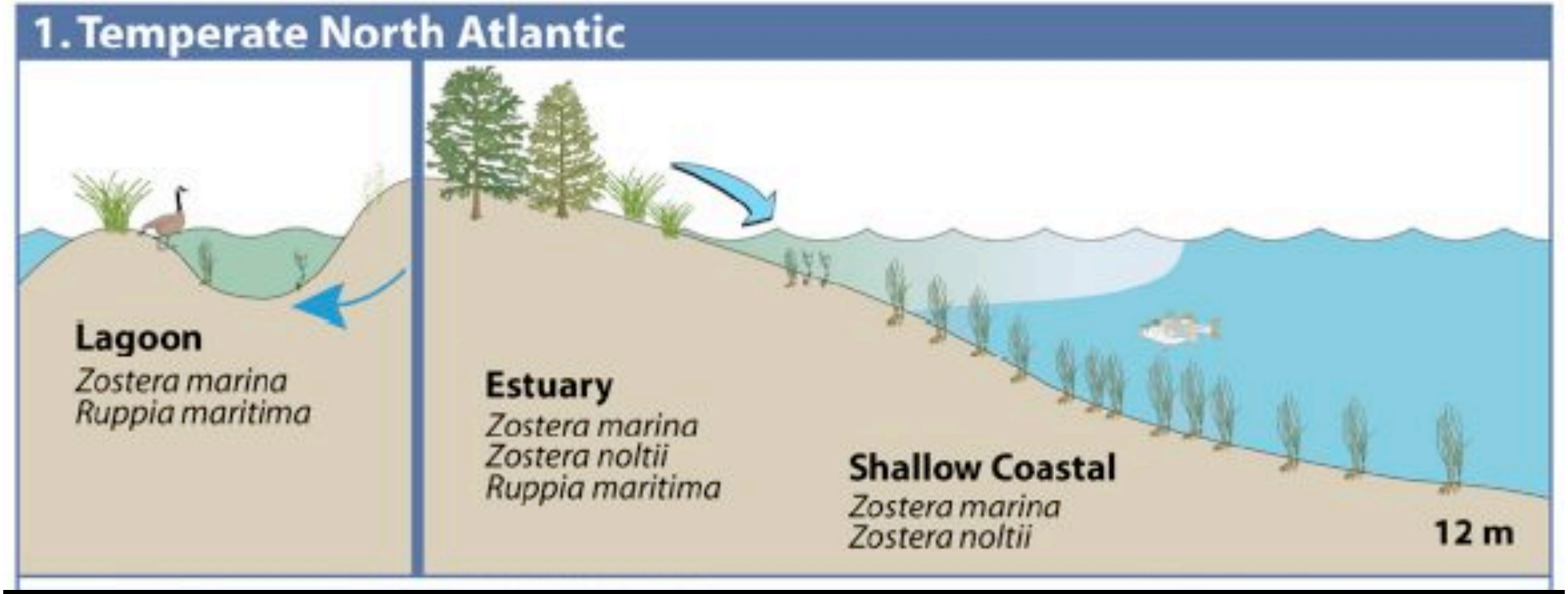
1) supports food web & fisheries

2) improves water quality

3) improves water quality & fisheries

4) supports nursery habitat & food web

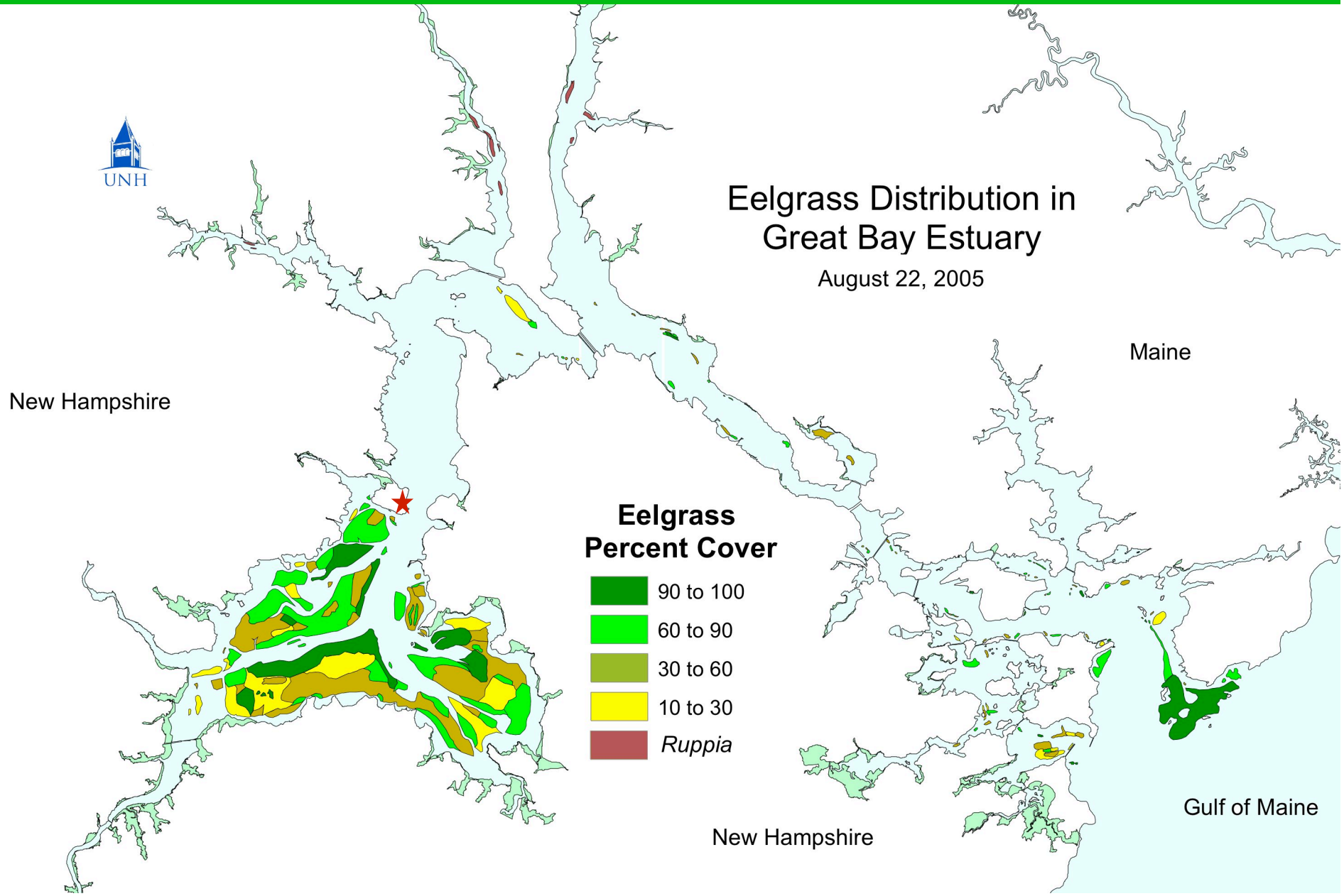
5) supports food web & fisheries



Short et al. 2007
JEMBE


Causes of decline globally:
Sediment loading
Nutrient loading
Climate change
Direct physical damage
© Galice Hoarau

Seagrass in the Great Bay Estuary



THREATS to Seagrasses	IMPACTS to Seagrasses	Result of Impact to Seagrasses
Water clarity	poor light	REDUCED PRODUCTIVITY / DEATH
Turbidity -- TSS	poor light	REDUCED PRODUCTIVITY / DEATH
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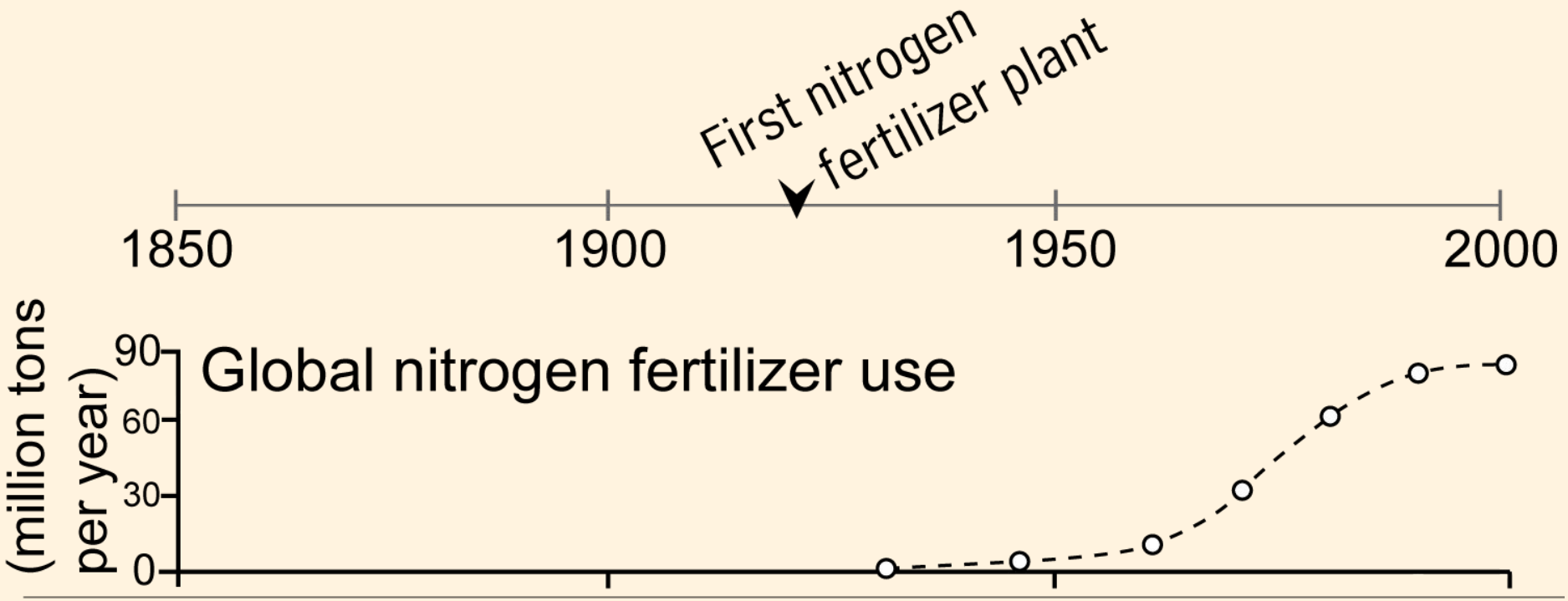
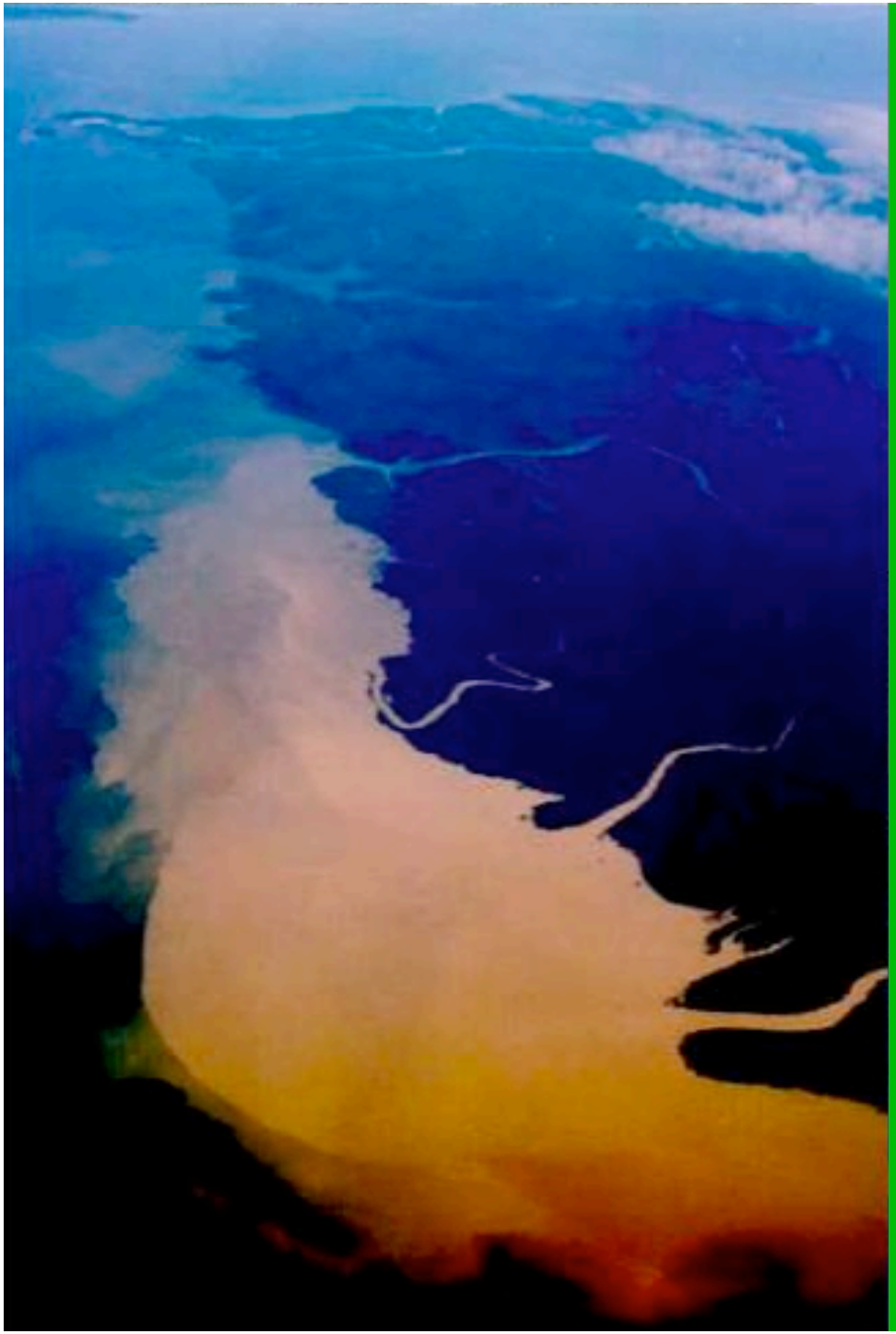
Bioturbation	uprooting/burial	REDUCED DENSITY / DEATH
Increased wave exposure	uprooting/burial	REDUCED DENSITY / DEATH
Dredge/ fill	uprooting/burial/shading	REDUCED DENSITY/ AREA/ DEATH
Fishing Activity	uprooting/burial/shading	REDUCED AREA / DEATH
Boating Activity & Docks	uprooting/shading	REDUCED AREA / DEATH

Pressures to seagrass: increased nutrient input (fertilizer and sewage)



Orth et al. 2006. Bioscience 56: 987-996


Nutrient Enrichment > Algae



Suspended Sediments

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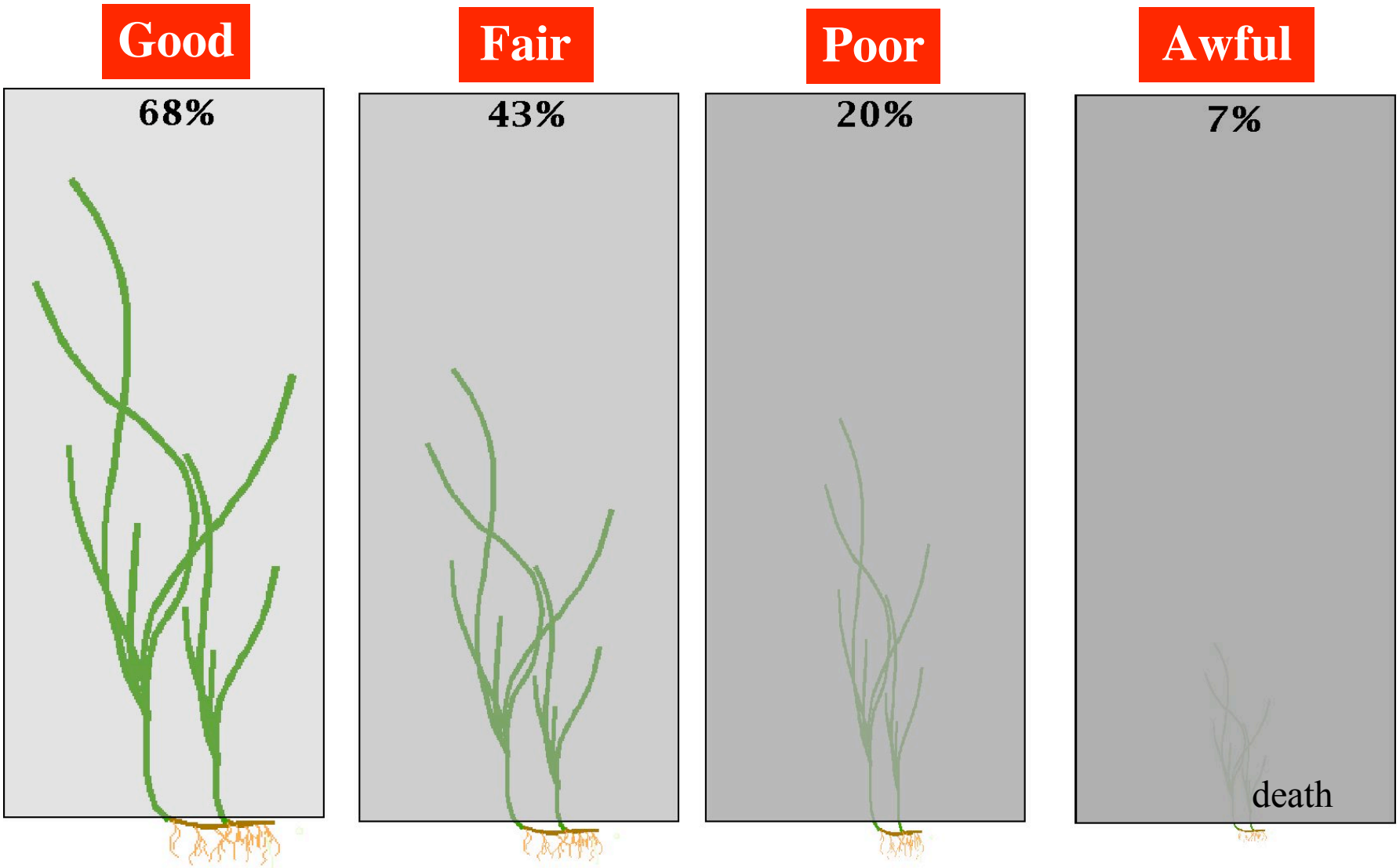
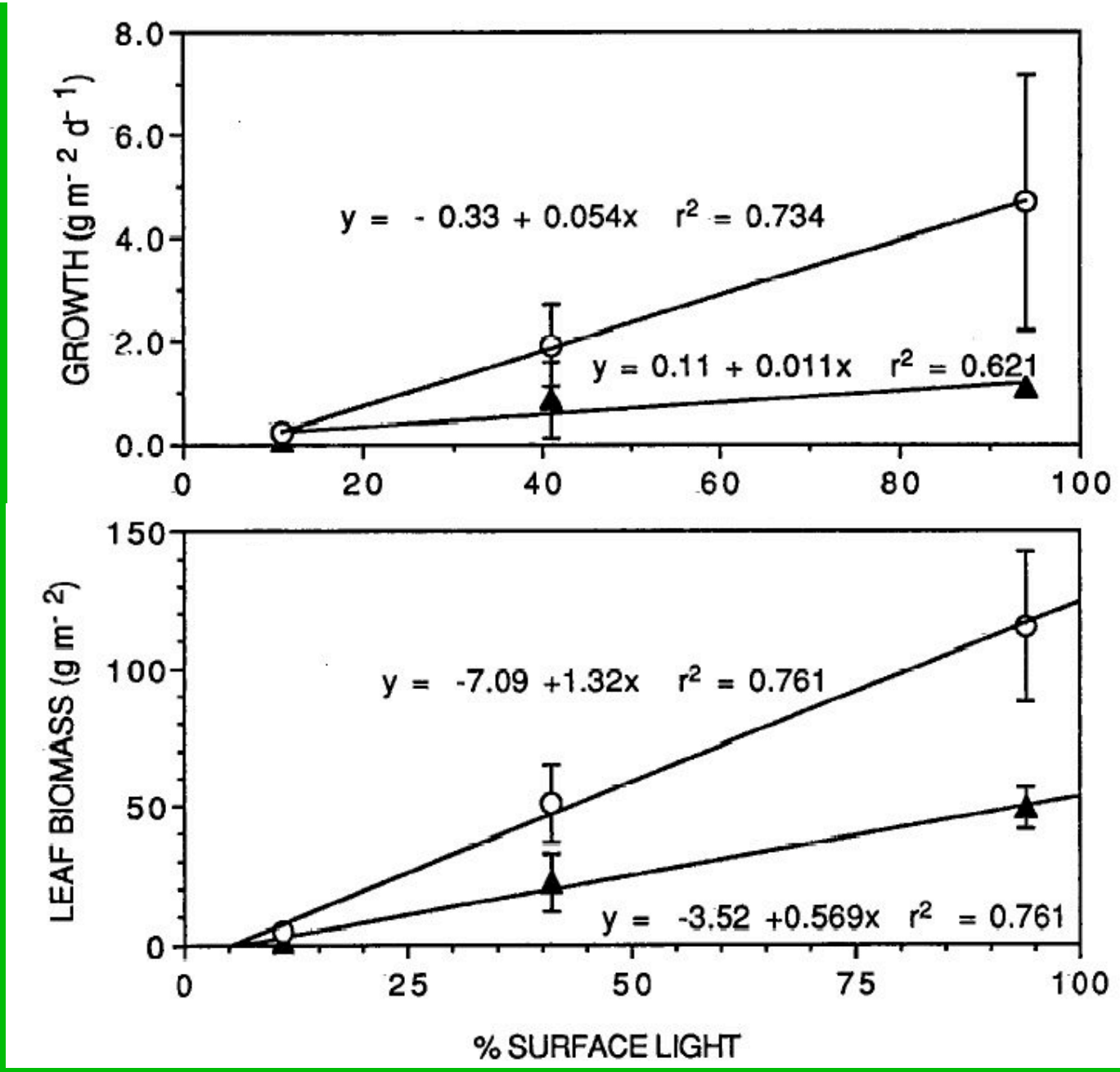
Massive land clearing and deforestation in Malaysia

Sedimentation - Road construction in Palau

Water quality and light



What are cumulative impacts?



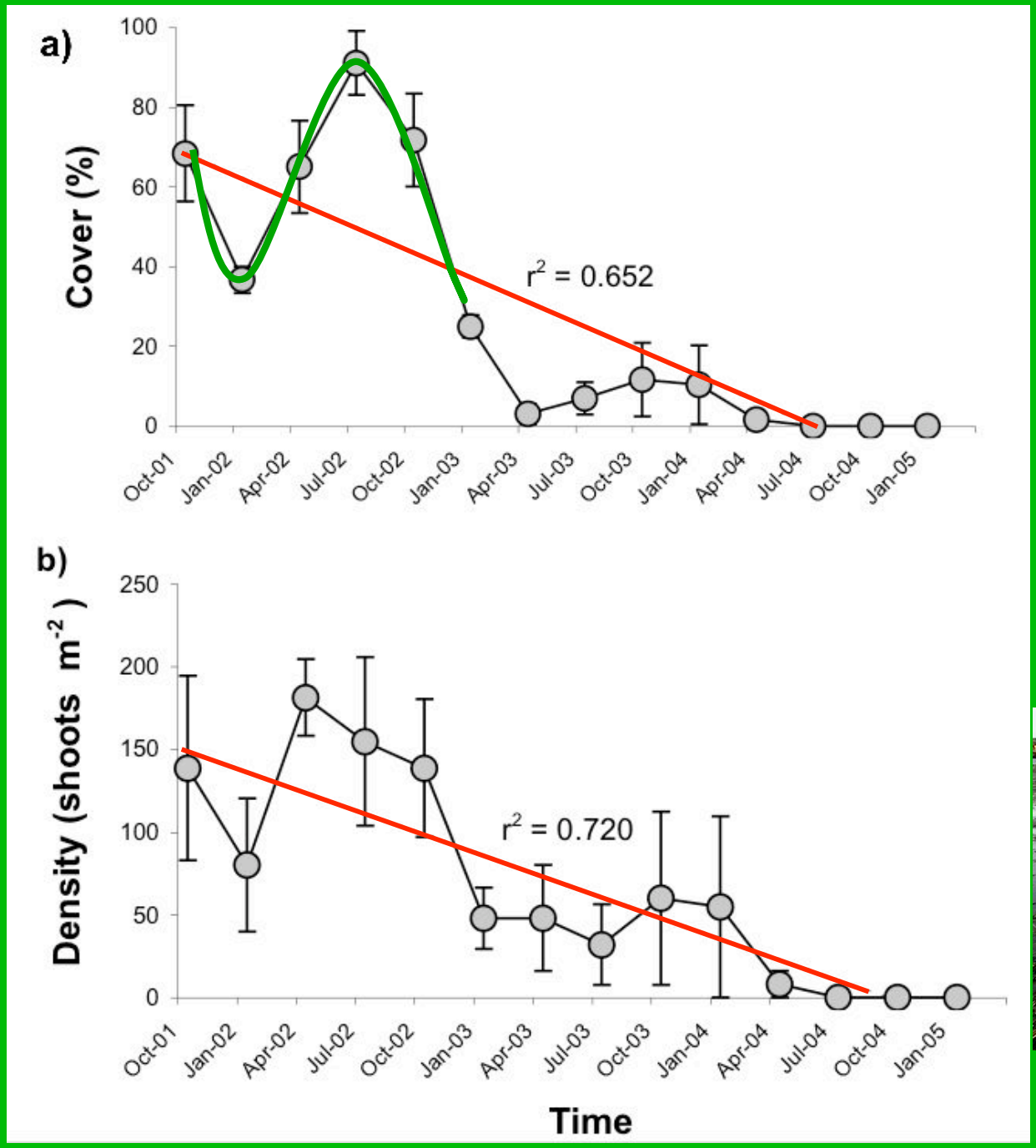
Short, F.T., D.M. Burdick and J.E. Kaldy. 1995. Mesocosm experiments quantify the effects of eutrophication on eelgrass, *Zostera marina* L., Limnology and Oceanography 40:740-749

Trawling


Moorings
Sept 2003

PORT EXPANSION / DREDGING

Fishing & boating activities



New Hampshire

Climate change

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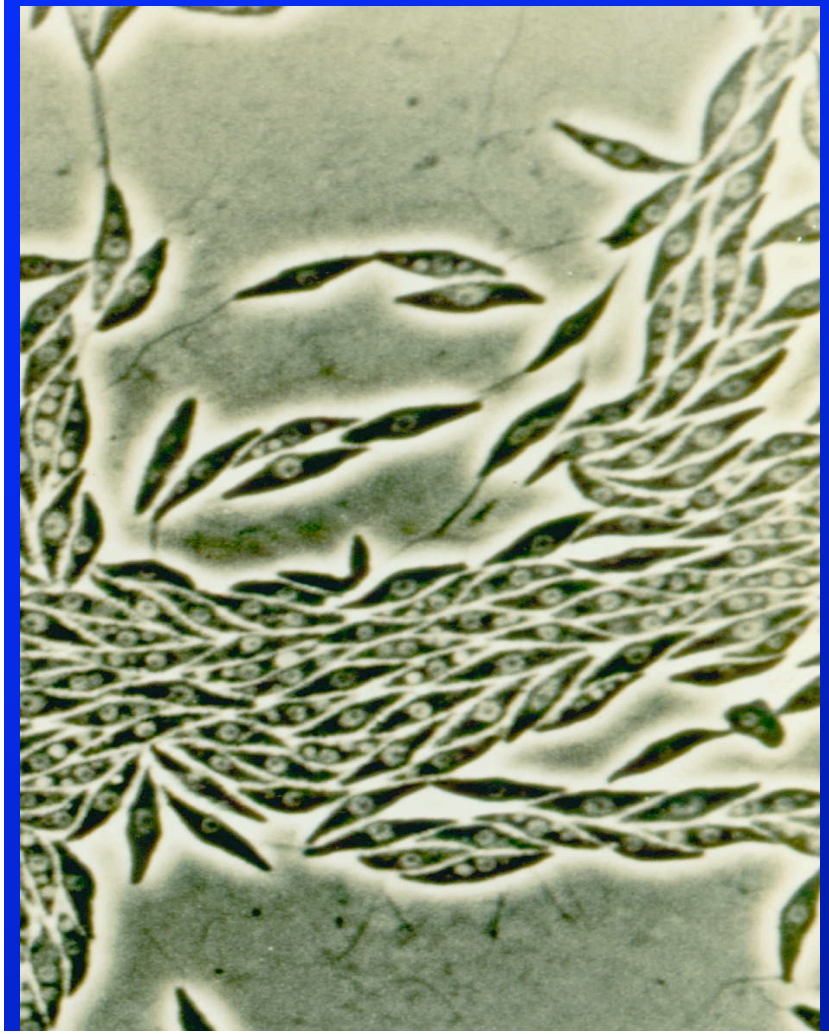
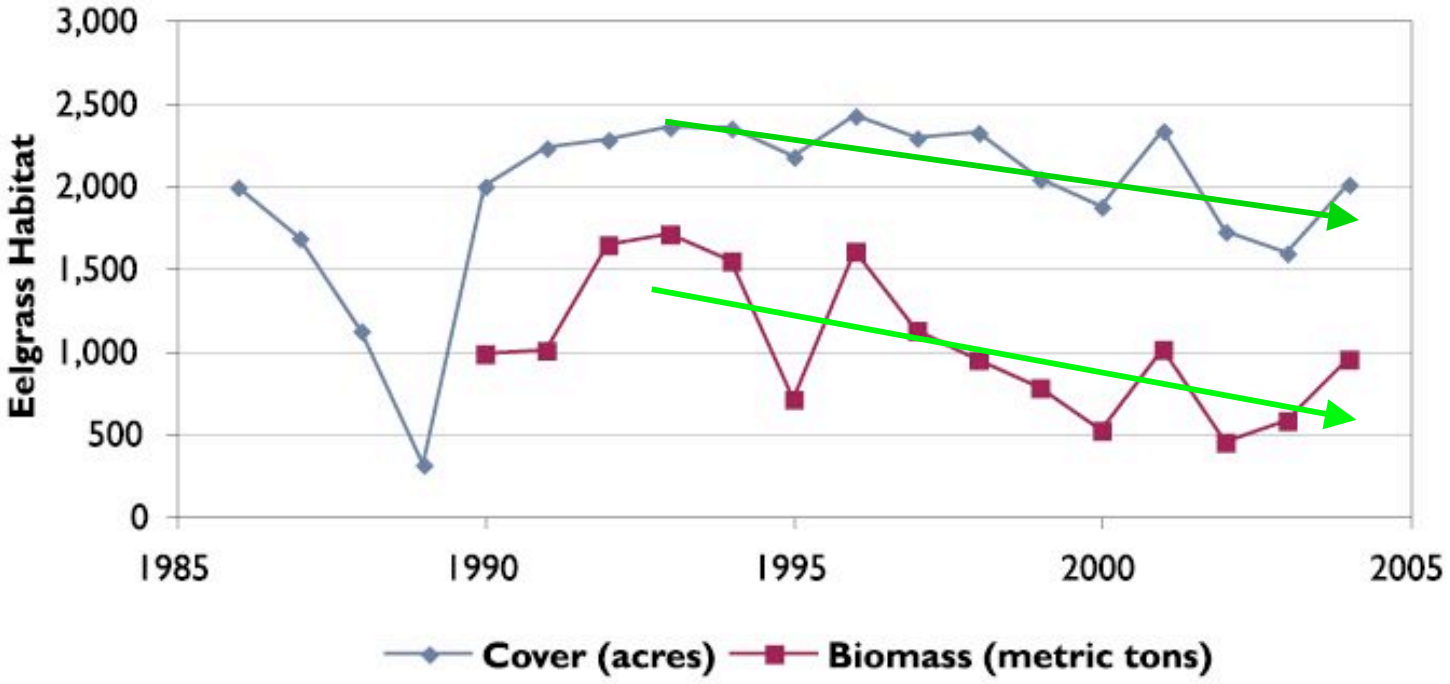
goose grazing

WASTING DISEASE LOSS

Labyrinthula zosterae

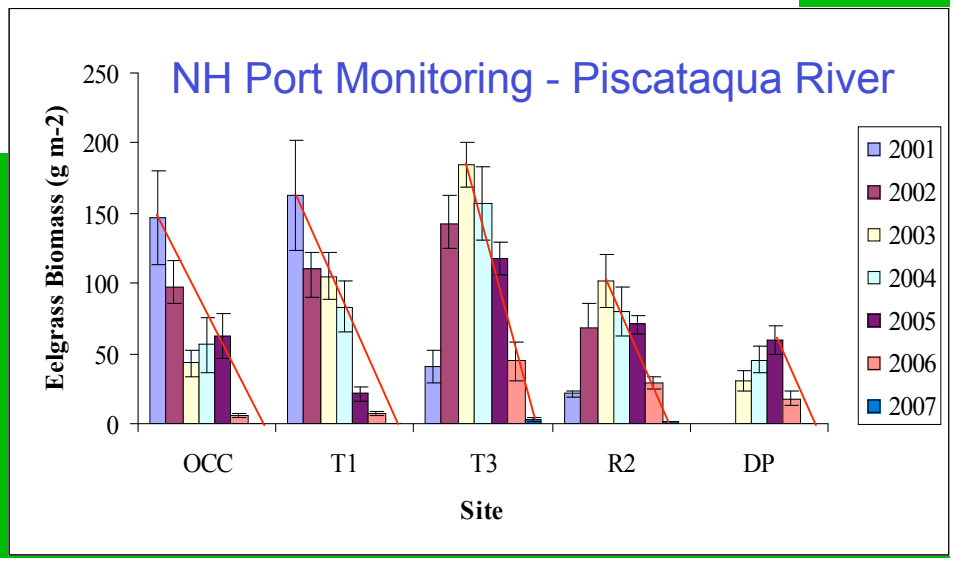


Monitoring Eelgrass cover and biomass in the Great Bay (Figure 17)



Data Source: UNH Seagrass Ecology Group

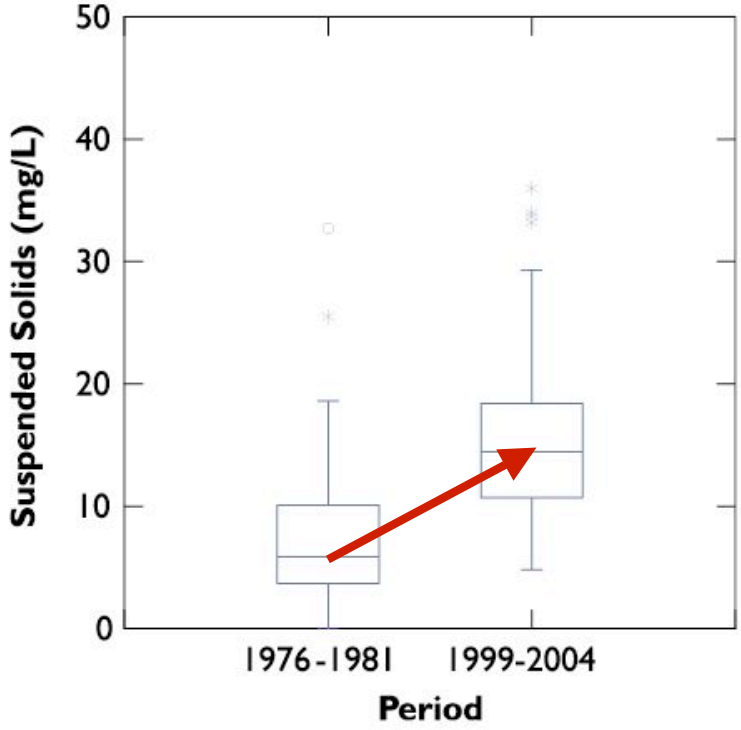
Eelgrass Monitoring in New Hampshire, USA



What is the cause of decline?

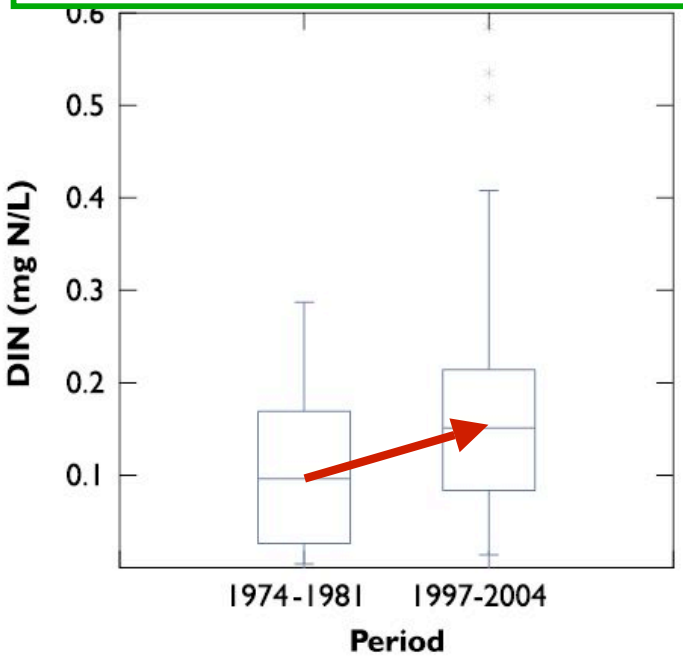
Suspended solids concentrations measured at Adams Point at low tide (Figure 7)

Data Source: UNH Jackson Estuarine Laboratory



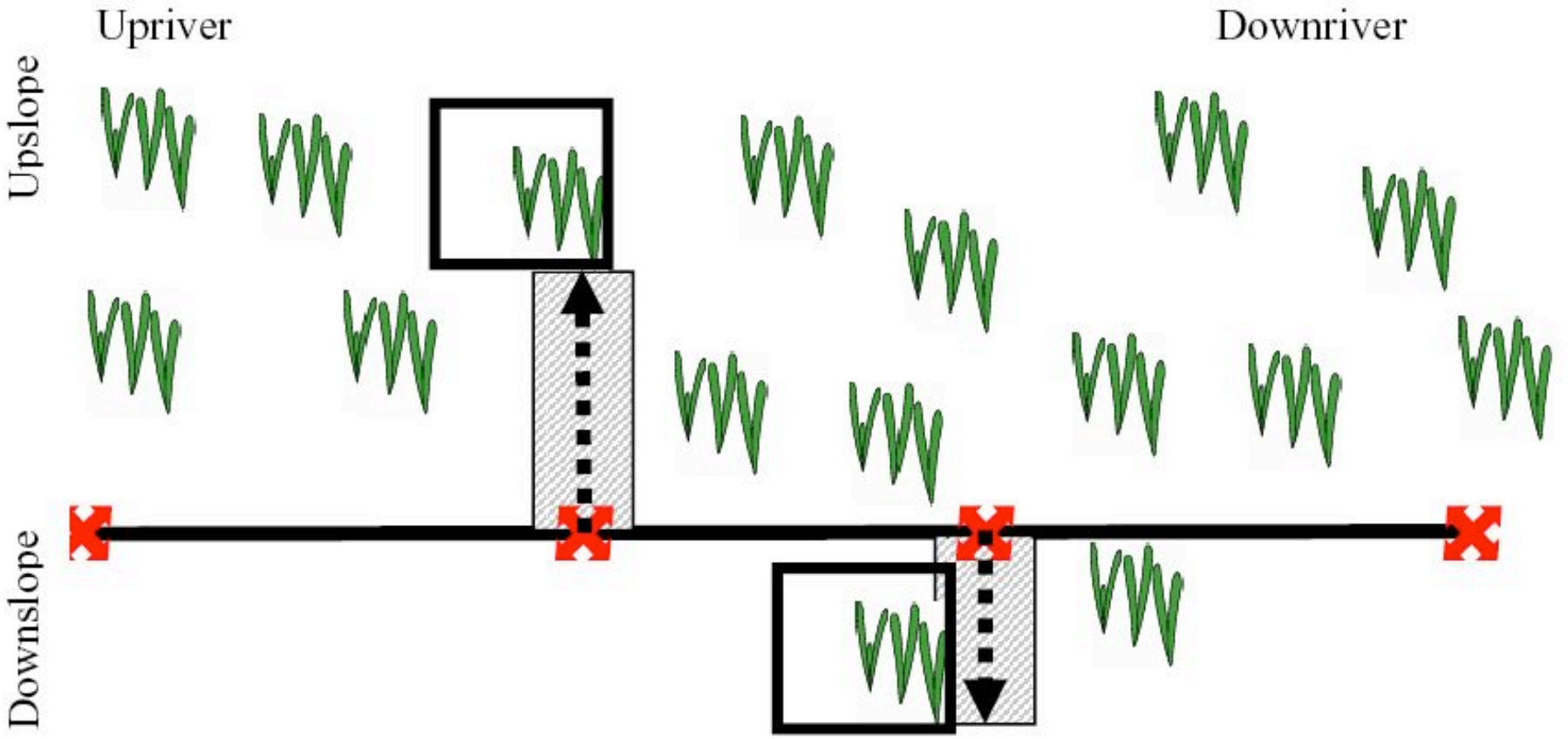
Dissolved inorganic nitrogen concentrations measured at Adams Point at low tide (Figure 6)

Data Source: UNH Jackson Estuarine Laboratory

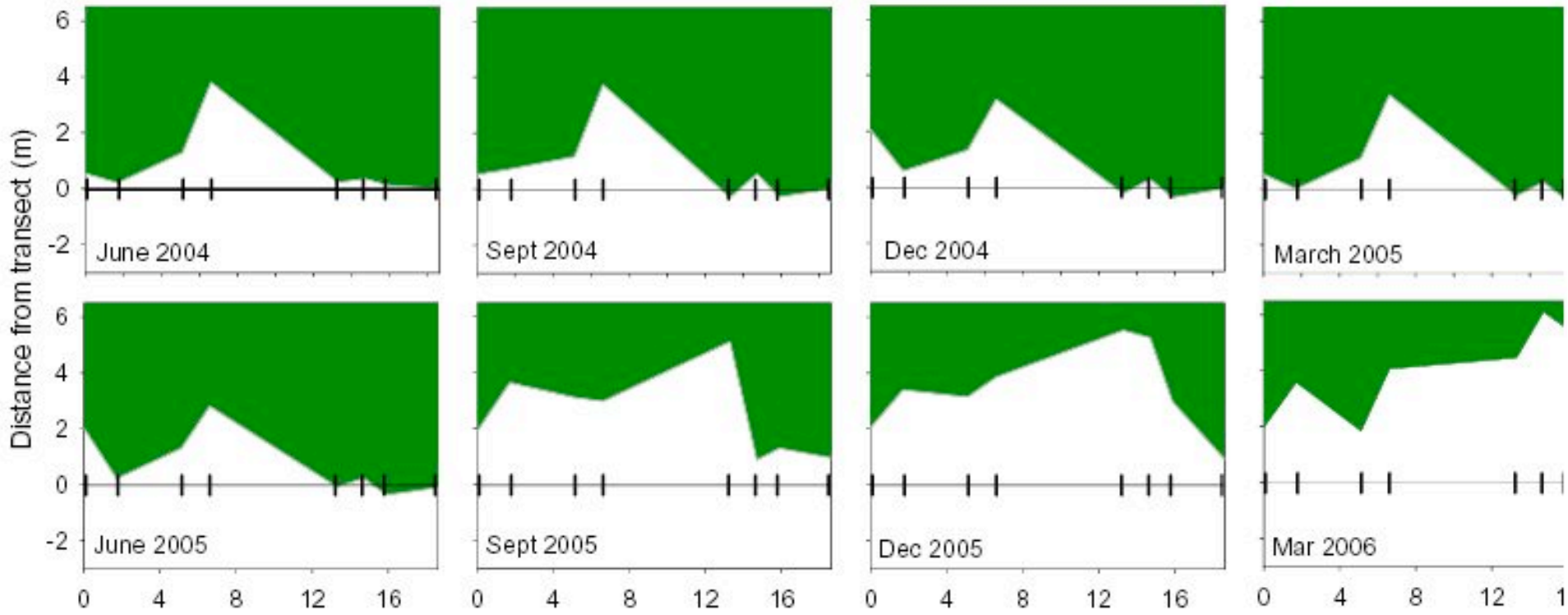


From: NH State of the Estuary Report 2006 - NHEP

Eelgrass Deep Edge Method



Rivers and Short (in review)


Distance from transect (m)
6
4
2
0
-2
June 2004
Sept 2004
Dec 2004
March 2005
June 2005
Sept 2005
Dec 2005
Mar 2006
0
4
8
12
16

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ACKNOWLEDGEMENTS

- New Hampshire Port Authority
- NOAA
- University of New Hampshire
- National Estuarine Research Reserves